

FIXTURE INTEGRATED DAYLIGHT DIMMING PHOTOSENSOR

| FD-301

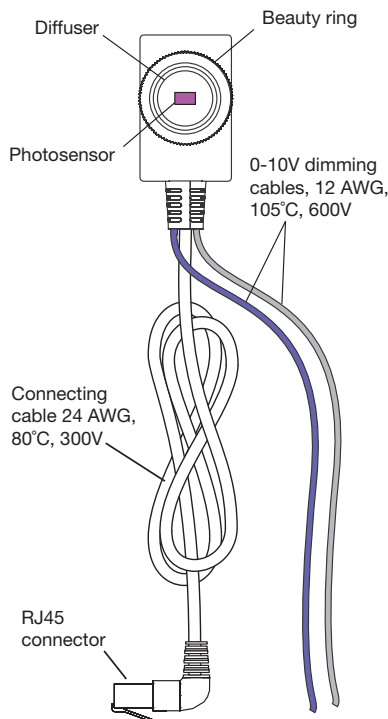
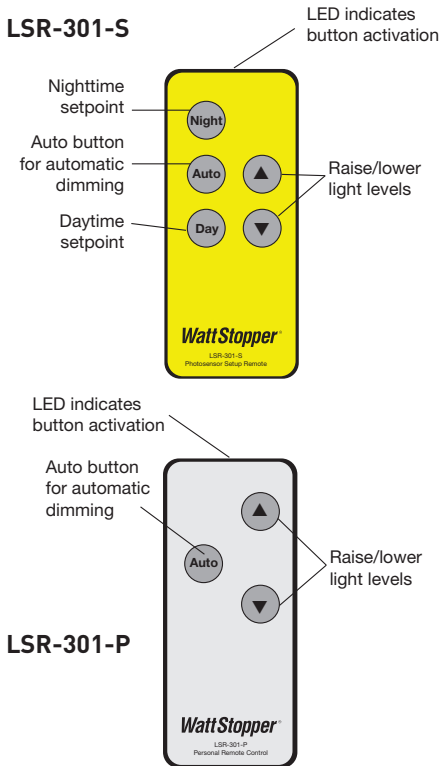


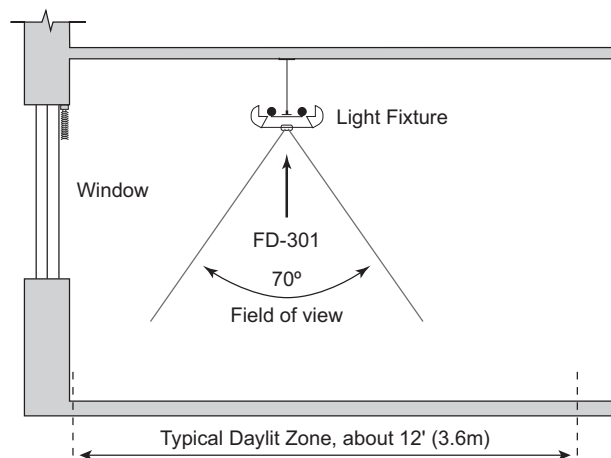
Product Overview

The FD-301 is a fixture-integrated dimming photosensor. It provides a continuous dimming signal to a 0-10 VDC dimming ballast, based on daylight levels. The FD-301 is a “closed loop” system; it considers both daylight and electric light when determining dimming levels. It uses a sliding setpoint control algorithm to maintain the desired illuminance levels for separate night and day target setpoints. The FD-301 slowly

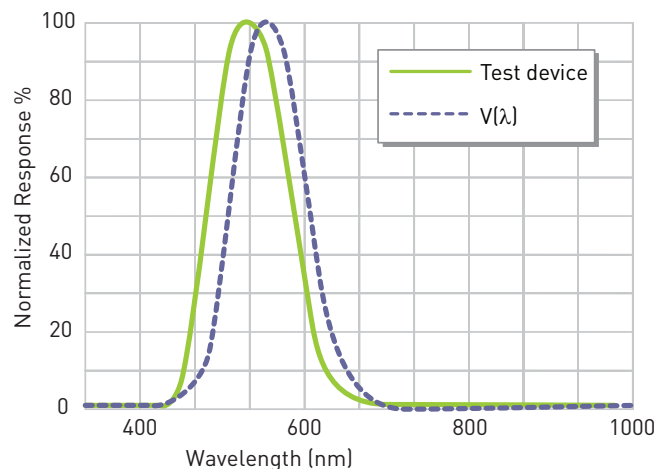
raises or lowers the electric lights to avoid sudden changes that can annoy occupants. After the photosensor-equipped fixture is installed, final setup adjustments are made using the LSR-301-S remote control setup tool. After commissioning, the FD-301 automatically adjusts the electric lights to meet target illuminance levels. The FD-301 is a low voltage device used in conjunction with a Wattstopper FS-PP power pack.

Models
FD-301
Specifications and Features
Operating voltage: 24 VDC
Power consumption: 9mA @ 24VDC
Max sink current: 50 mA
Dimensions: 1.57" x 0.98" x 0.84" (40mm x 25mm x 21.4mm) LxWxD
Weight: 64.4 grams (2.27 ounces)
Operating temperature: 32 to 104°F (0 to 40°C)
Operating humidity: 5-95%, non-condensing
Full range dimming: 0.2 VDC (min.) to 10 VDC (100% lighting) output voltage
Includes 6' (1.83m) lead with RJ45 connector and 1' (0.3m) bare leads for 0-10 VDC signal
RJ-45 wire length: 6' (1.83m)
Maximum ballast control: 50
Sliding setpoint control algorithm
Photopic curve accurately measures light as perceived by human eye
Precise control of lighting to maintain desired light level
Optional occupant remote for increased user satisfaction and maximum energy saving
UL and cUL listed
Indoor use only
Five year warranty
Materials
ABS, flame retardant
Meets materials restrictions of RoHS
Factory Defaults
Requires configuration using LSR-301S

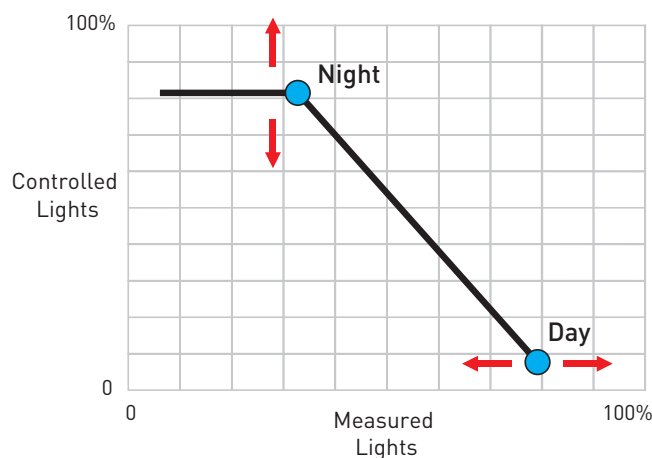


Detection Features

Spatial Response

The spatial response describes the sensitivity of the photosensor to incident radiation from different directions. By having a 70 degree field of view, the optical signal sensed by the FD-301 is very representative of the overall work plane illuminance, and it is less affected by normal activity in the room, such as occupant interference or temporary changes to room reflectances.


Spectral Response

The FD-301 features an advanced photocell component. For the first time in a photosensor, the photocell's response matches the human perception of light. It measures energy only in the visual range, instead of measuring energy over a wider range than the visual spectrum as do most photocells. Most photocells measure infrared and ultraviolet energy as well, and over-report daylight because it contains large amounts of these types of energy. In research conducted by the Lighting Research Center (LRC), it was estimated that over-reporting daylight illumination could result in controlled light levels being 40% lower than desired. By eliminating this source of error, the FD-301 greatly improves performance.


Control Algorithm

The FD-301 uses a sliding setpoint control algorithm. This means it has separate night and day setpoints. Each setpoint represents the desired photocell signal under that condition. To determine the correct dimming level for any given photocell reading, it calculates the level based on the slope of the line between the two setpoints. The result is accurate dimming that maintains the task illumination.

Sliding setpoint does require adjustment twice, once with no daylight present, usually at night, and once with daylight present. However, the FD-301 greatly simplifies the adjustment procedure with individual adjustment buttons on the commissioning/set-up remote.

Photosensor Placement and Commissioning

The photosensor-equipped fixtures are commissioned under two conditions, Night and Day. Either adjustment may be completed first. The red LED under the photosensor's lens flashes continuously until the Night and Day adjustments are both completed. Then, it can begin automatic dimming.

Conditions for Setup

Set up photosensor-equipped fixtures after all furnishings are installed. Placement of furnishings affects the way light reflects from various surfaces.

- Furniture, floor and wall coverings must be installed and clean.
- All light fixtures must be installed and fully operational.
- Window coverings must be installed, clean and operable.
- Remove unnecessary objects such as tools and installation materials from the photosensor's view.
- Do not block primary sources of electric light or daylight from reaching the photosensor's view.

Window blinds: If installed in the area, adjust them to maximize daylight while not allowing direct beam sunlight to enter the controlled area. At night, adjust them so they block lighting from outdoor fixtures. Lights from other areas: If non-dimmed lights in adjoining areas contribute to the light viewed by the photosensor, these lights must be on during both Day and Night adjustments.

Target Illuminance Levels

Determine the illuminance required in the controlled space. In some applications, a footcandle target may be specified for the controlled space. If this is the case, use a light meter to take measurements before and during the commissioning process. Choose a reference location in the controlled area that is most likely to have the lowest illuminance level during daylight conditions and is located farthest from the window or skylight. If the illuminance level is too low, select another location, or measure the illuminance level on a brighter day. If no target illuminance is specified, adjustments can be based on user perception or preferences.

Adjustment Procedure

Initial adjustments to the photosensor are done using the 5-button LSR-301-S remote control. The LED on the FD-301 should light every time you press a button on the remote. The remote's green LED also flickers for the duration of the press.

▲ (up arrow) Press to increase light output.

▼ (down arrow) Press to decrease light output.

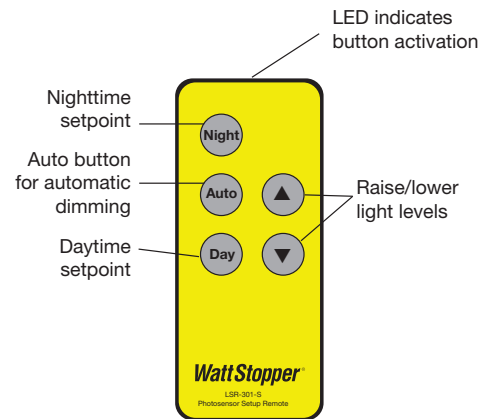
Night Press to begin and end the Night adjustment process.

Auto Press to begin automatic dimming.

Day Press to begin and end the Day adjustment process.

Day Adjustment

Make this adjustment when daylight is providing illumination that is typical of the daytime conditions at the reference location in the controlled area.



LSR-301-S

1. Press the Day button once. The FD-301's green LED flickers.
2. Press ▲ or ▼ to adjust electric lights to the appropriate light level.
3. If an illuminance target is specified by the lighting designer, use a light meter at the workplane to verify the footcandle value.
4. Once the appropriate illuminance level is reached, press and HOLD the Day button for 3 seconds. The FD-301 acknowledges setting of the Day target setpoint by lighting the green LED twice for 3 seconds each time.

Night Adjustment

Make this adjustment when there is no daylight illumination at the reference location. To complete the night commissioning during the day, the night environment must be simulated by blocking all sources of daylight.

1. Press the Night button once. The FD-301's green LED flickers.
2. Press ▲ or ▼ to adjust light level. If an illuminance target is specified by the lighting designer, use a light meter at the workplane to verify the footcandle value.
3. Once the target level has been reached, press and HOLD the Night button for 3 seconds. The FD-301 acknowledges setting of the Night target setpoint by lighting the green LED twice for 3 seconds each time.

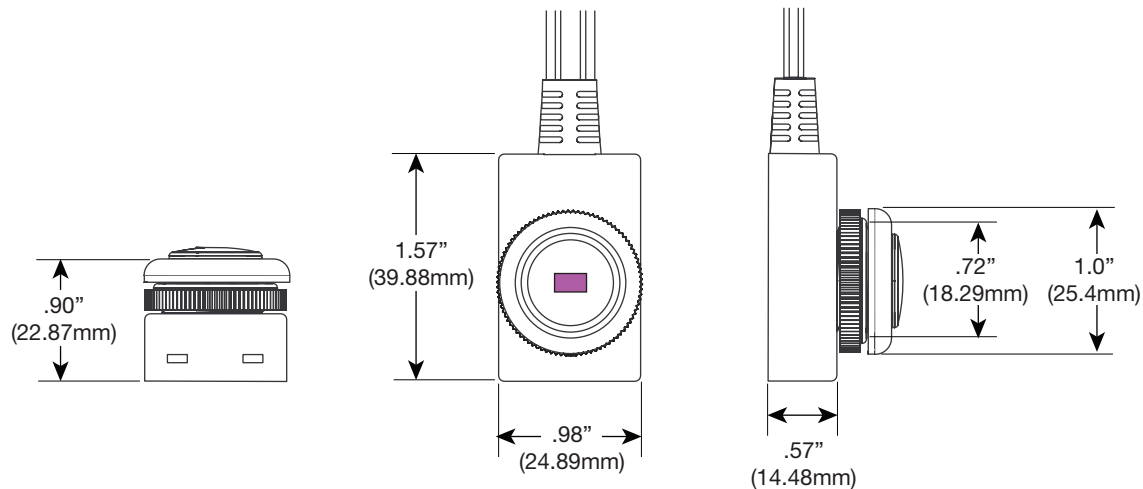
Begin Automatic Dimming

Using the LSR-301-P, the user can raise the target illuminance level by up to 25% of the target illuminance level set with the LSR-301-S during commissioning, or reduce target illuminance to the minimum level for the connected lamp/ballast.

Pressing the ▲ (up arrow) or ▼ (down arrow) temporarily raises or lowers the target illuminance level. The FD-301 controls the lights to maintain the new target level until another button is pressed.

Pressing Auto cancels the user adjusted target illuminance level. The FD-301 returns to automatic dimming using the levels set with the LSR-301-S.

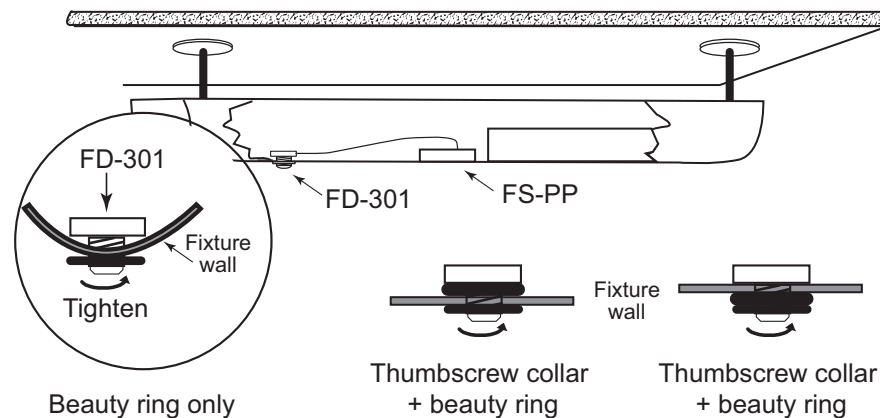
Dimensions



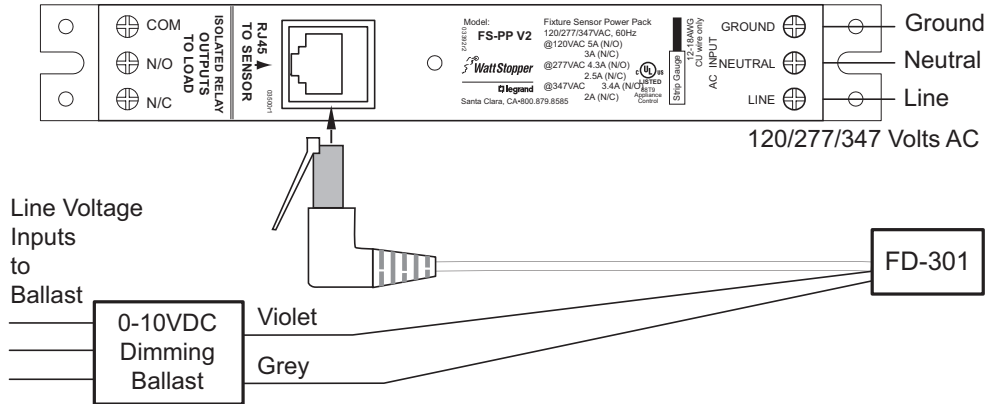
Installing the FD-301 Sensor and FS-PP Power Pack in Light Fixture

Mount the FD-301 so the fixture's lamp output (candlepower distribution) is outside the sensor's peak sensitivity area.

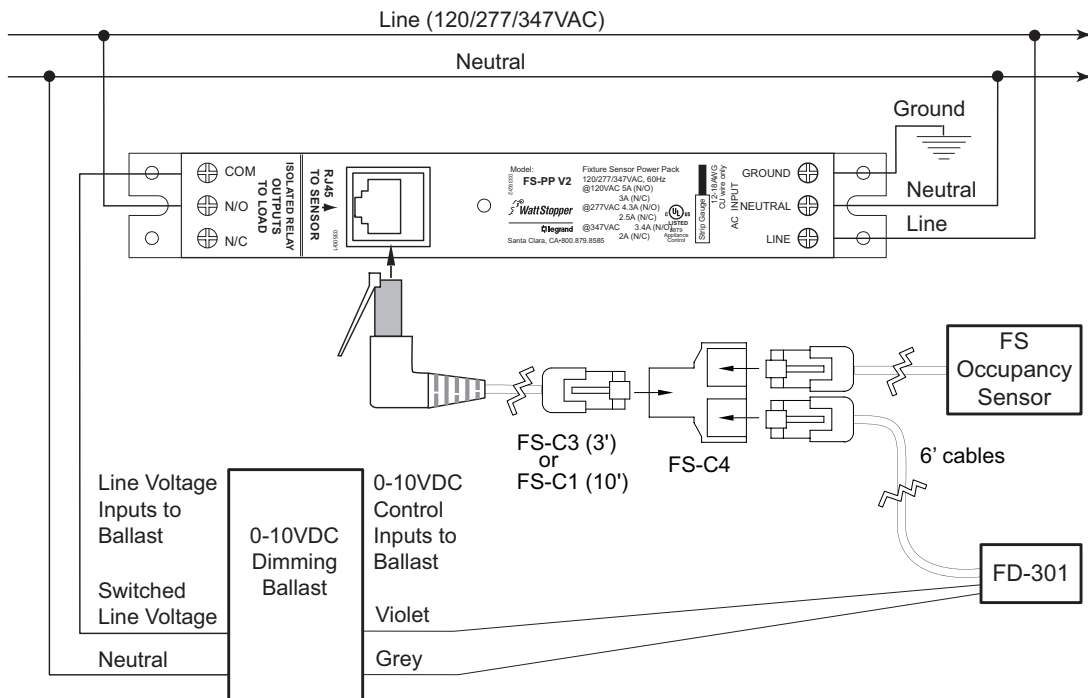
1. Install the FS-PP as directed in the installation instructions provided with the power pack.
2. Determine an appropriate mounting location for the FD-301 inside the light fixture. Cut a 3/4" diameter hole through the sheet metal in the bottom of the fixture.
3. A beauty ring and thumbscrew collar are supplied to secure the FD-301 lens through the fixture wall. Depending on the wall thickness and curvature, the installer may need to use the thumbscrew collar on the
4. Insert the lens from the inside of the fixture, through the hole in the bottom of the fixture. If the lens extends too far outside the fixture, use the thumbscrew collar to adjust the depth. Tighten it to the outside of the fixture or tighten it against the sensor body before inserting the lens through the fixture wall. Then, put the beauty ring onto the lens pipe and tighten it securely.



Wiring Diagrams

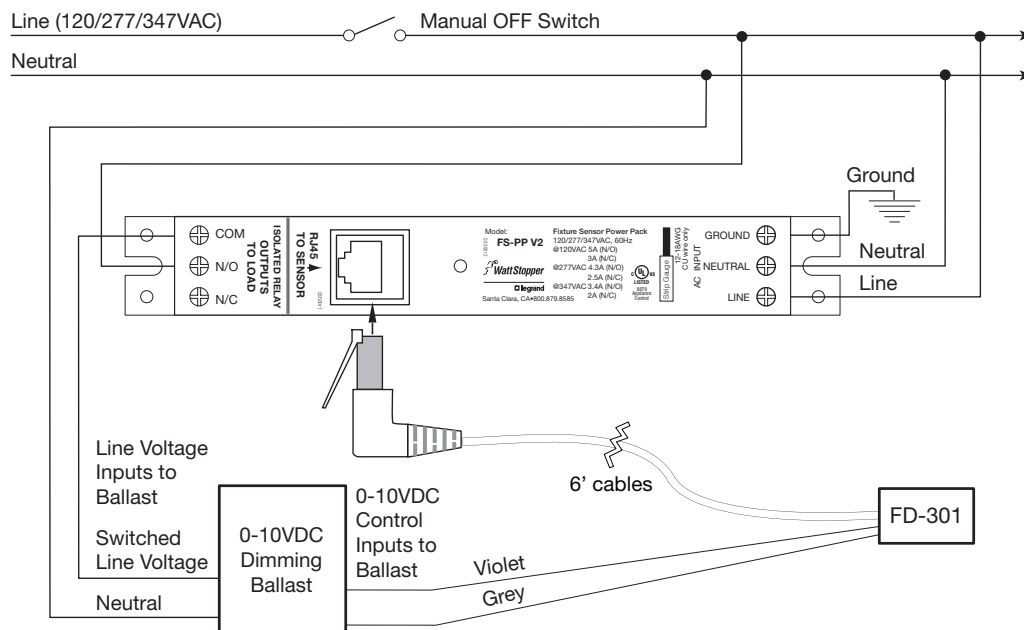


To connect FD-301 with FS-PP power pack, plug in RJ45 from FD-301 into TO SENSOR receptacle on FS-PP. Connect violet and grey wires from FD-301 to 0-10V inputs on dimming ballast or driver.



To add occupancy-based, automated on/off control, combine the FD-301 sensor with an FS occupancy sensor. Connect wiring as shown.

Wiring Diagrams



To add manual off control using a local switch, connect wiring as shown.

Sequence of Operation

The FD-301 is designed to mount to a light fixture and dim a single zone of lights.

To immediately begin automatic dimming after the Night and Day adjustments are BOTH completed, press the Auto button. Otherwise, ten minutes after the last adjustment keypress, the following will occur:

- If only the Night setpoint has been adjusted, the signal to the ballast will remain at the level to which it was adjusted. The red LED will continue to flash.
- If only the Day setpoint has been adjusted, the signal to the ballast will go to full output (10VDC). The red LED will continue to flash.
- If both Night and Day setpoints have been established, the FD-301 will begin automatic dimming.

The red LED will flash until both the Day and Night setpoints are properly adjusted. The Night setpoint must always require more electric light output than the Day setpoint. If it does not, the red LED on the FD-301 will flash to indicate an invalid setpoint.

Ordering Information

Catalog #	Master Pack Details				
	Master Pack Quantity	Case dimensions (inches)			Weight (pounds)
		Length	Width	Height	
FD-301	200	16.35	12.75	20.27	38.4
LSR-301-S	250	N/A	N/A	N/A	N/A
LSR-301-P	250	N/A	N/A	N/A	N/A
FS-PPv2	100	21.14	19.72	10.31	21.8

Inner Pack Quantity	Inner Pack Details			
	Case dimensions (inches)			Weight (pounds)
	Length	Width	Height	
50	19.75	7.88	8.25	9.12
N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A

Catalog #	Color	Description	Input Voltage
<input type="checkbox"/> FD-301	White	Fixture Integrated Daylight Dimming Photosensor	24 VDC
<input type="checkbox"/> LSR-301-S	White	Setup Remote Control (required)	Two AAA batteries (included)
<input type="checkbox"/> LSR-301-P	White	Occupant Remote Control	Two AAA batteries (included)
<input type="checkbox"/> FS-PP v2	White	Fixture Sensor Power Pack	120/277/347 VAC; 60Hz

Information supplied above is subject to change.

Harmonization code: 8542310000. Country of origin: China.